Paper No. 55

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte FUSEN E. CHEN, FU-TAI LIOU, TIMOTHY E. TURNER, CHE-CHIA WEI, YIH SHUNG LIN and GIRISH A DIXIT

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Appeal No. 1998-2671
Application No. 08/480,543

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ON BRIEF

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Before THOMAS, HAIRSTON, and RUGGIERO, Administrative Patent Judges.

RUGGIERO, Administrative Patent Judge.

ON REQUEST FOR REHEARING

Appellants request that we reconsider our decision of February 27, 2001 wherein we sustained the Examiner's rejection of claims 3, 9-11, 13, and 18 under 35 U.S.C. § 103, as well as the obviousness-type double patenting rejection of claims 3, 10-12, and 18.

In our original decision, we determined that the Examiner, based on the combination of Schilling with either Tracy or Wolf, had established a prima facie case of obviousness which had not

been persuasively rebutted by any convincing arguments of Appellants. Similarly, we found Appellants' arguments to be unpersuasive with regard to the obviousness-type double patenting rejection based on claims 16-18 of U.S. Patent No. 5,108,951.

Appellants have set forth several arguments alleging error in our original decision which sustained the Examiner's rejections. However, on reconsideration of our decision of February 27, 2001 in light of Appellants's comments in the Request for Rehearing, we find no error therein. We, therefore, decline to make any changes in our prior decision for the reasons which follow.

Initially, Appellants argue (Request, pages 3-5) a lack of support in the teachings of the applied references for the conclusion in our original decision that the combined teachings of Schilling and Tracy would result in the formation of an alloy that would fill the contact hole opening in an insulating layer of an integrated circuit device. In particular, Appellants take issue with the reasoning in our original decision which pointed out that the thickness of the refractory metal layer in Schilling is within the range contemplated by Appellants for the formation of an alloy. Appellants now argue that thickness of the refractory metal layer is not the only consideration for

determining whether a contact hole filling alloy would be formed with a deposited metal layer but, rather, the depth of the contact hole must also be taken into consideration. According to Appellants, a deeper contact hole opening will require more refractory metal than a shallow hole to result in alloy formation.

We note that any arguments concerning depth of the contact hole and whether such depth is a factor to be considered in alloy formation were not made in the Briefs. An argument not timely made is an argument waived. Nevertheless, we would point out that, aside from any consideration as to the merits of Appellants' contact hole depth argument, no such limitation involving depth of the contact hole appears in any of the appealed claims. Further, an Examiner is required to give examined claims their broadest reasonable interpretation consistent with the specification and, as Appellants themselves admit (Request, page 4), no disclosure of any particular contact hole depth appears in their disclosure.

Similarly, we find no error in the conclusion in our original decision that the Examiner's line of reasoning established proper motivation for modifying Schilling by adding the deposition temperature teaching of Tracy. We remain

convinced, and unpersuaded by Appellants' arguments to the contrary, that a skilled artisan, seeking guidance on the proper deposition temperature to achieve full contact hole coverage, would have been led to the teachings of Tracy. We further remain of the position that, for all the reasons articulated by the Examiner, the resultant combination of the teachings of Schilling and Tracy will result in the filling of a contact hole with a formed alloy as claimed.

In a further argument related to the motivation issue, Appellants contend that we erred in our original decision by selectively choosing Tracy's second deposition step which is performed at an elevated temperature for application to the disclosure of Schilling, and ignoring Tracy's disclosure of an earlier deposition process performed at a lower temperature. We find such allegation to be without merit. As disclosed by Tracy, it is the second deposition step, performed at 400°-500° C which results in full step coverage of the contact hole as illustrated in Tracy's Figures 3 and 4 and described at column 4, lines 1-35. In our view, the skilled artisan, seeking the proper deposition temperature for full step coverage of a contact hole, would have been led to the temperature associated with Tracy's second

deposition step since this is the temperature which provides the desired full step coverage.

As to Appellants' arguments with respect to the combination of Wolf with Schilling, we find these to be a reiteration of those arguments made with regard to Tracy. We find such arguments to be unpersuasive of any error in our original decision as discussed supra.

Lastly, we find no error in the affirmance in our original decision of the Examiner's obviousness-type double patenting rejection based on claims 16-18 of U.S. Patent No. 5,108,951. We find that the alleged differences between claims 16-18 of U.S. Patent No. 5,108,951 and the claims on appeal, as enumerated at page 9 of the Request, are not actually present in the appealed claims. None of the appealed claims have any limitations regarding the thickness of the refractory metal layer, nor is the use of a refractory metal/refractory metal nitride composite as a barrier layer precluded by the appealed claims. Similarly, an initial lower temperature deposition of aluminum over the refractory layer, as set forth in claim 16 of U.S. Patent No. 5,108,951, is not precluded by the claims on appeal.

We have granted Appellants' request to the extent that we have reconsidered our decision of February 27, 2001, but we deny the request with respect to making any changes therein.

No period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

REHEARING/DENIED

JAMES D. THOMAS Administrative Patent Judge	)	
KENNETH W. HAIRSTON Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
JOSEPH F. RUGGIERO Administrative Patent Judge	)	

lp

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